A PROPOSAL FOR THE IMPROVEMENT OF THE MAINTENANCE PROGRAM IN THE URBANDALE COMMUNITY SCHOOL DISTRICT

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by

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CHAPTER I

INTRODUCTION

With so much tax money being spent each year on the construction of new school buildings, the importance of proper and effective maintenance of this property is becoming more and more important. Not only day-to-day maintenance but also preventive and long-range maintenance must be considered.

The problems of school plant maintenance begin on the day the school board accepts a building from the contractor and continue throughout the entire life of the building. Experience indicates that in far too many instances school officials fail to recognize this fact, assuming that a new building requires little or no maintenance until it has been used for several years. This is a mistake, and sometimes a costly mistake, for the school official to permit maintenance needs to accumulate before he attempts to develop a planned maintenance program. An adequate school plant maintenance service is vitally important to the pupils, to the educational program, and to the community. The well kept school building not only serves as a shelter and a school home for the pupils; in addition, it serves as a tool of education and frequently the center of community life. It is essential that school plants be so operated and

maintained that they provide optimum service. Adequately planned, well built school buildings may be so operated and maintained that they fail to provide this service, while average or sometimes mediocre buildings may provide satisfactory service if they are properly operated and maintained.

Dedicated to school and community uses and representing a major community interest as well as being the major community investment, the school plant should be so maintained that it merits continued community appreciation and adequate financial support. Good school management programs do not just happen. They must be well planned, manned by competent personnel, given a fair share of the school district's revenue, operated to serve the best interest of the pupils, and managed efficiently.

Both the existing facilities and those that are to be added from year to year will require adequate maintenance if they are to function satisfactorily as tools of education. The importance of maintaining these facilities lies partially in the necessity for obtaining optimum service from them as well as for protecting the district's financial investment in them. It seems natural that expenditures for maintenance accomplish both purposes. Such expenditures make possible a cleaner, healthier, safer school environment and purchase additional years of usefulness, thus prolonging

the interval between replacement dates.

Another significant point is that maintenance, if adequately financed, consumes an important segment of the school dollar. It is generally agreed that if a planned maintenance program is followed by the school district, not less than five per cent of the district's current operating budget will be required to support an adequate maintenance program.[1] For a new school building, it has been suggested that from one-half to one per cent of the total plant cost be allocated annually for its maintenance.[2] For older buildings, from one to two per cent of the present replacement cost should be allocated.[3]

I. STATEMENT OF THE PROBLEM

The primary purpose of this study was to arrive at a proposed maintenance program that would be appropriate for use in the Urbandale Community School District, where the writer is employed as Assistant Superintendent with respon-

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[1]Otto K. Fernalld, "How Many Custodians Do You Need?," School Management, II (October, 1958), 62.

[2]George H. Bush, "Maintenance Practices for New School Buildings," American School and University, 1957-58 (29th edition; New York: American School Publishing Company, 1957), pp. 274-75.

[3]C. M. Cornell, "Preventative Maintenance of Buildings," The Nation's Schools, LVI (October, 1955), 104-8.

sibilities as director of maintenance. By reviewing literature about maintenance programs and articles by authorities on maintenance, criteria for a good maintenance program were determined. An attempt was then made to evaluate the Urbandale School District's program relative to these criteria and establish guidelines for a future maintenance program at Urbandale.

II. DEFINITION OF MAINTENANCE

According to Finchum, maintenance consists of the services, activities, and procedures which are concerned with preserving, protecting, and keeping buildings, grounds, and equipment in a satisfactory state of repairs. It covers a wide range of activities including repairs, replacements, renovations, and adjustments.[1]

Good maintenance, the organized and orderly procedure by which proper repairs and replacements are made, can greatly reduce the rate of deterioration. The over-all purpose of maintenance, as Finchum describes it in another book called School Building Maintenance Procedures, is to safeguard the public's investment, increase the functional life of the buildings, and provide the best possible envi-

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[1]R. N. Finchum, School Plant Management, United States Department of Health, Education, and Welfare, No. 15 (Washington: Government Printing Office, 1960), p. 1.

ronment for teaching and learning.[1]

III. AIMS OF THE MAINTENANCE PROGRAM

The over-all objectives of maintenance are to keep school facilities in such condition that they will meet the requirements of the educational program. More specifically, maintenance aims, as outlined by Finchum, include those activities, services, and procedures which help to: (1) promote health and safety, (2) provide operating economies, (3) prevent time loss, (4) preserve property values and retard deterioration, (5) prevent obsolescence, and (6) develop community pride.[2]

Promote health and safety. If school buildings are to be free of conditions which may adversely affect the health and safety of the pupils and school employees, they must be kept clean and properly heated, ventilated, and lighted. If noise is a factor, some method of control must be used. Unsanitary conditions create many health problems. Respiratory diseases are spread through dust and germ-laden air. Digestive disorders are often brought on by consump-

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[1]R. N. Finchum, School Building Maintenance Procedures, United State Department of Health, Education, and Welfare, No. 17 (Washington: Government Printing Office, 1964), p. 1.

[2]Finchum, School Plant Management, p. 7.

tion of food which has been improperly stored, prepared, handled, or served. Many other health hazards may be created by unsanitary, foul-smelling toilet areas. Classrooms that are underheated or overheated and are poorly ventilated do not promote good health.

In addition to providing a school environment which is conducive to good health and to favorable conditions for learning, officials are obligated to maintain safe school facilities. Parents have the right to demand safe buildings, grounds, and equipment since they are required by law to send their children to school. Article 299.1 of the School Laws of Iowa states that:

> Any person having control of any child over seven and under sixteen years of age, in proper physical and mental condition to attend school, shall cause said child to attend some public school for at least 24 consecutive school weeks in each school year.[1]

School safety, an all-inclusive term, covers such risks as fire, mechanical, electrical, boiler room, and maintenance hazards. The old idea that "the King can do no wrong" no longer helps schools claim immunity in liability cases. By law, schools are permitted to purchase liability insurance. Article 517A.1 in the School Laws of Iowa states:

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[1]State Department of Public Instruction, School Laws of Iowa, 1958, Article 299.1 (Des Moines: The State of Iowa, 1960), p. 548.

> All state commissions, departments, boards, and agencies . . . are hereby authorized and empowered to purchase and pay premiums on liability, personal injury and property damage insurance covering all officers. . .[1]

Fires are the most spectacular of all hazards, and they occur at the rate of eleven every day during the month.[2] In order to eliminate many fire hazards, school plant planning and maintenance programs need to consider, among other things, the arrangement and design of stairwells and shafts, firewalls for corridors leading to exits, fire-resistant materials for corridor floors and stairs, types and locations of exits, segregation of building areas in which fire is most likely to originate, the installation of fire-protective equipment, and the installation of fire doors.

Mechanical features of the school plant are another safety hazard that must be considered by school officials. Things such as unprotected outside stairs; entrance platforms; narrow inside stairs; risers that are too high and treads that are too narrow; slippery surfaces for stair treads, ramps, and floors; lack of handrails; corridors with open radiators and protruding drinking fountains; and shower rooms with slippery floors and uncontrolled hot water valves

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[1] Ibid., Article 517A.1, p. 698.

[2] Paul Kearney, "How Fire-Safe Is Your Child's School?," National Parent Teacher, LIV (September, 1959), 10-12.

are only a few examples of mechanical features that can cause injury to students and employees.

Electrical hazards are particularly noticeable in older buildings and are flaws such as open wiring, unprotected outlets, metal switch covers, switch boxes in wooden cabinets, frayed extension cords draped over nails, electrical motors without grounds, and the absence of pilot lights.

Boiler room hazards are not as noticeable in newer buildings, but even low pressure boilers can be dangerous if safety devices are not working properly.

No matter how well a structure has been planned and constructed, it is subject to deterioration and, without proper maintenance, safety hazards are bound to increase.

Economy of operation. As buildings age, they become increasingly difficult and often more expensive to maintain and operate in a manner that will provide maximum service and safety. One aim of planned maintenance is to effect operating economies, in some instances, by providing maximum services at no increase in cost or, in others, at reduced cost.

Finchum has stated:

> In general, school plant operating economies seem to fall into three categories, namely (1) labor, (2) utilities, and (3) supplies and equipment. In many buildings, especially in older ones, such items as convenient

> service sinks, adequate and convenient storage of custodial supplies and equipment, suitably located electrical service outlets, and both hot and cold water hose outlets at strategic locations have been overlooked.[1]

The maintenance department can correct these conditions, so that the time consumed by custodial employees in running to remote parts of the building to obtain tools and supplies and later replacing them can be cut to a minimum. In cleaning operations, where labor accounts for ninety per cent of the cost,[2] correction of these conditions could save many custodial man-hours during the school year. Another maintenance procedure which has been found to reduce the custodial load to the extent of three full-time employees in a school district whose population is about eight thousand involved the use of a circulating floor maintenance crew to perform all the floor waxing for the district.[3]

In the category of utilities, proper maintenance may effect economies in the cost of water, fuel, and electricity. For example, a water faucet with a steady drip will waste about nine thousand gallons of water each year. A faucet

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[1]Finchum, School Plant Management, p. 10.

[2]"How to Reduce Maintenance Costs," School Management, II (February, 1958), 32.

[3]Richard A. King, "Developing Progressive Maintenance," American School Board Journal, CXXXVI (May, 1958), 55-65.

with a steady stream one-eighth inch in diameter will waste nine thousand gallons in three days, or more than a million gallons in a year. In addition, if these faucets are on hot water lines, there is a waste of fuel to heat the water.[1] Replacement of gaskets, or even the faucet itself, is an inexpensive maintenance procedure which may save many dollars during the course of a school year.

Electrical services often become expensive because of wasted current. Old, inefficient motors consume more current and deliver less power than new motors. Color of ceilings affect illumination levels. If the ceilings do not have the proper reflectance factor, or if they are dirty, they decrease the efficiency of electric lights. In addition, electric lights often replace natural light because outside windows are not clean. The atmospheric soiling of glass over a month's period will impede the transmission of light by as much as twenty-five per cent.[2]

Other school plant operating economies may be effected through the selection, purchase, and use of maintenance tools and equipment. Such economies may be realized through greater efficiency in work standards, improved quality of

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[1]Richard Irmiter, "The Care and Cleaning of Plumbing Fixtures in School Buildings," American School Board Journal, CXIX (July, 1949), 45.

[2]Henry H. Linn, "Economies in Plant Operation,"

results achieved, decreased quantity of materials used, and in improved morale among workers whose feeling of achievement will be higher than that of personnel without adequate equipment. For example, the purchase of an electrical scrubbing-buffing machine and a wet-dry vacuum machine may save enough custodial man-hours during one year of use to more than pay for the equipment. At the same time, better cleaning and polishing results will be shown and the operators will have more pride in their accomplishments.

Prevent loss of time. Finchum has further pointed out:

> Another purpose of maintenance is to prevent plant shutdown and time loss, which may be achieved through a program of preventive maintenance, a plan which is similar to that of preventive medicine, operating on the principle that "a stitch in time saves nine," and that it is important to correct minor defects before they take on major proportions.
>
> In years prior to the advent of complicated mechanical and service features of school buildings, breakdowns necessitating the closing of school were rare. But as these features have been added, there is greater opportunity for serious mechanical failures which make it necessary to close the school until repairs are made. Thermostatically controlled heat, electronically controlled motors and services involving hydraulics are all examples of the complicated mechanical features which can cause major trouble in the present day school system.[1]

American School and University, 1945-46 (17th edition; New York: American School Publishing Company, 1945), pp. 281-89.

[1]Finchum, School Plant Management, p. 12.

In situations where preventive maintenance is practiced, there is no assurance that emergencies will not arise, but emergencies are far less frequent when periodic checks of equipment, followed by replacement of defective parts or faulty items, are made.

Preserve property values. In most communities, local heavy taxes have been levied to make possible the school properties, which represent a high financial investment to the community. Preservation of these properties is an evident aim of maintenance. By having an adequate school plant maintenance program, deterioration is retarded, fire hazards reduced, the need for extensive rehabilitation is decreased, and the useful lives of the buildings and equipment is extended, thus preserving the community's investment.

Prevent obsolescence. All across the country, communities own buildings that no longer seem to meet the requirements of present day educational programs. Finchum has stated:

> In some instances, these communities have either reached or approached the maximum limit of their bonding capacity, and can no longer provide the necessary funds for new school construction. These and other economy minded communities may be able to decrease their school housing problems by improving conditions in the existing buildings. Many of these, lacking in some of the elements essential to a good environment for learning but suitably located with respect to school population,

> are too sound structurally to be abandoned. Such buildings are generally classified as obsolete, yet in most instances can be improved to adequately meet today's educational needs through a program of renovation.[1]

Develop community pride. School officials are aware of the fact that a clean, well kept school not only contributes to the health, happiness, and character development of the children, but it also promotes a favorable community attitude toward the school, develops respect for school property, and thus becomes a factor in its preservation.

Adequate care of school property also has favorable public relations implications. In most communities, it is pleasing to the public to know that officials have preserved public school property through efficient, economical management procedures. This public attitude is often demonstrated by the reasonable financial support given to the school and the pride with which its facilities are shown to outsiders.

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[1] Ibid., pp. 13-14.

CHAPTER II

REVIEW OF LITERATURE REGARDING CRITERIA OF MAINTENANCE PROGRAMS

Many articles and books have been written concerning ideal maintenance programs. All of these seem to point out certain criteria which are necessary if the maintenance program is to be successful.

I. TYPES OF PROGRAMS

There is no one best type of program for all school districts to try to follow, but Viles suggested that most districts follow some phase of the following:

1. All maintenance may be done by the school maintenance staff.
2. All maintenance be done by contract.
3. Staff and contract maintenance be intermingled.
4. Most maintenance may be done by the staff, but local journeymen may be used on special jobs.
5. Maintenance staff intermingled with summer and other assistance from regular custodians.[1]

Actually a small school system will vary its organizational structure from year to year depending on the maintenance tasks that develop from year to year. A district might go for several years without having to contract any major maintenance work done, but the time will come when

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[1]N. E. Viles, "Maintaining and Replacing Schools," American School Board Journal, CXXXIX (July, 1959), 23-24.

the school staff will not be able to handle a particular task.

Also, as a school district grows and new staff members are added, certain jobs that have had to be contracted before will be able to be accomplished by the local staff due to the increased abilities of the staff.

It must be pointed out that a school district is not wise in spending money to try to do a maintenance job it is not capable of doing, for, even though the job might be completed, the quality of workmanship that goes into it will not be high and the job will probably have to be done again soon.

II. ESTABLISHING NEEDS

Specific needs at each school location must be known before a school district can develop a well planned, efficient, low-cost maintenance program.

Long-range planning. The first step in long-range planning involves collecting factual data on all sites, buildings, and equipment. This should be done by means of a maintenance survey conducted by the director of maintenance, the building principal, selected teachers, custodian, and possibly some technically trained members of the community. An example of what might be included in a maintenance survey

can be found in the Appendix. An analysis of the maintenance needs of a school plant requires a wide, practical knowledge of school building construction. The director of maintenance and the technically trained members can supply this knowledge, while the principal, teachers, and custodian--those who actually work and live in the building--can direct attention to maintenance needs about which they have knowledge.

The survey team should inspect every part of the school plant, including grounds and equipment, and every maintenance requirement should be listed, giving an estimated cost. Priority ratings should be given to each need listed.[1] At the completion of the inspection, an evaluation will disclose just how many of the first priority items can be handled during the first year. If there are too many items, certain ones will have to be delayed until a later time.

Routine inspections and periodic checks. After a comprehensive maintenance survey has been made of the district, the maintenance needs of the buildings can be kept current by routine inspections and periodic checks.

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[1]Harry F. Walton, "Surveying and Programming Maintenance Needs," 1952 Proceedings (Kalamazoo, Michigan: Association of School Business Officials, 1952), pp. 102-9.

These inspections should be made by the school principal and his custodian. The principal should be alert for conditions which affect the health and safety of students and teachers, while the custodian should inspect hardware, glass, lights, mechanical and electrical systems, furniture and equipment, and various types of controls. Needs that are discovered should be reported to the director of maintenance.

Miller, in his article "Program for Preventive Maintenance, stated:

> Periodic checks of all electrical motors, starter control equipment, heating and ventilating systems, water heaters, instructional equipment, and many other phases of the school plant should be made by maintenance specialists. These checks should be made at least once annually, preferably during the summer vacation when there is ample time and less chance of interfering with school activities.[1]

In addition to periodic checks by school maintenance personnel, certain parts of the school plant may need periodic checks by architects, engineers, boiler inspectors, and representatives of insurance companies or their rating bureaus. The services of architects and engineers will be required if there is any question concerning building safety, while the services of professional boiler inspectors are usually required for insurance purposes.

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[1]Graham R. Miller, "Program for Preventive Maintenance," American School and University, 1954-55 (26th edition; New York: American School Publishing Company, 1954), pp. 458-59.

III. DEVELOPING A MAINTENANCE SCHEDULE

A well planned maintenance program must be flexible enough to cope with the unexpected, specific enough to utilize to best advantage the time and skills of all employees, and broad enough to cover all maintenance categories. In order that the major maintenance jobs are evenly distributed, a long-range master schedule must be made which includes these major projects. Each job must be given a tentative starting and completion date, with various members of the staff being assigned to them. The development of a master schedule will involve an analysis of maintenance needs as to type of which there are generally about five.

Recurring maintenance. Recurring maintenance refers to school maintenance tasks and jobs which should be performed one or more times each year. Examples of these tasks include floor and furniture reconditioning, certain cleaning operations such as window glass and lights, lawn and grounds maintenance, and care of mechanical and heating equipment.

The frequency of floor care depends upon the number of students, the amount of traffic, the condition of the area around the building, and the type of floor coverings. Some corridors with heavy traffic may need to be washed and waxed weekly, while some classrooms may need to be washed and waxed only twice a year.

Pierce felt:

> In general, light fixtures and interior glass surfaces should be cleaned once each month; exterior glass at least twice a year, and all painted interior classrooms and corridors should be cleaned once each year.[1]

Lawns and grounds take constant care during certain times of the year. At less frequent times, pruning trees and shrubs and removing dead and diseased trees and limbs need to be done. During the cold season, heavy snows must be removed from steps, walks, and driveways.

Mechanical and heating equipment requires constant maintenance and frequently specialized maintenance. Pumps and motors need to be oiled, boilers blown out, and ventilating systems adjusted.

In large systems, recurring maintenance tasks are many times assigned to rotating crews who take care of different buildings on a recurring cycle. An example of this would be a floor crew that moves from building to building taking care of individual building needs on a recurring cycle. The crews would be equipped with all the tools and facilities needed and, in general, would work after school hours and evenings.[2]

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[1]David A. Pierce, Saving Dollars in Building Schools (New York: Reinhold Publishing Corporation, 1959), p. 88.

[2]Buven E. Tucker, "Operations of a Floor Maintenance Crew," American School and University, 1956-57 (28th edition; New York: American School Publishing Company, 1956), p. 432.

King said:

> This plan is reputed to be highly satisfactory both from the standpoint of efficiency and economy. It is efficient in that personnel become more skilled by doing one type of work than by performing a variety of tasks; it provides more consistent and uniform maintenance of floors; and it improves the efficiency of regular custodians by relieving them of onerous, time consuming tasks. The plan is economical in that it reduces the number of custodians needed, increases the life of asphalt tile beyond ordinary expectations, and requires less wax, thus reducing wax bills.[1]

Many districts add to a floor crew like this during the summer and increase the scope of their work to include cleaning walls and woodwork and washing lights, interior glass, and windows.

Periodic maintenance. Periodic maintenance refers to those jobs and tasks which may need attention less frequently than recurring maintenance jobs. Generally these jobs are repair and renovation which follows cycles of from three to five years. Tasks that fall into periodic maintenance are as follows: (1) exterior and interior painting; (2) roof repair; (3) repair of window shades, blinds, and curtains; (4) weatherproofing windows, doors, and walls; and (5) repair to the heating plant.

Painting is one of the most costly areas of a preventive maintenance program. The primary purpose of exte-

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[1]Richard A. King, "Developing Progressive Maintenance," American School Board Journal, CXXXVI (May, 1958), 55-65.

rior painting is to protect exposed surfaces; the secondary purpose is to improve appearances. Interior painting is done to increase light reflection and preserve surfaces. The amount of time between exterior paintings will vary depending upon climatic and weather conditions, but generally outside painting should be done every three to five years.[1] Little can be done to prolong the life of outside paint other than to use quality products and expert workmanship.

Interior painting, again depending upon conditions, can usually be expected to last at least five years.[2]

However, two methods have been used by various schools to prolong the interval between interior painting jobs as well as cut down the cost of painting. Nathan Patterson stated:

> The Muscogee County School District, Columbus, Georgia, adopted a scheme or standard for all interior painting for the entire district--a system-wide color scheme subject to no change except on a long-term basis. However, schemes for small or special interior areas may be changed as required, with little or no noticeable effect on the program. It has been reported that this plan can reduce interior painting costs by 100 percent, more or less, depending on local conditions.[3]

Another plan is explained by Ralph G. Corwin:

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[1]Nathan M. Patterson, "Long-Range Maintenance and Yearly Maintenance," 1957 Proceedings (Evanston, Illinois: Association of School Business Officials, 1958), pp. 103-7.

[2]Ibid.

[3]Ibid.

> The City Board of Education of Los Angeles, California, as well as other school districts over the country, substitutes a wall and ceiling washing procedure for painting where practical. It is reported that the use of appropriate solutions, applied by proper equipment, will set back former painting frequencies by several years, and may cost about one-fourth as much as a new paint job. In most instances, the results are so good that the average person does not realize that there has not been a repaint job.[1]

Roof repair, or lack of it, is one of the most irritating of school maintenance problems. Failure to take precautions to prevent leaks may lead to serious damage to interior surfaces, walls, and equipment. Frequent inspections, minor repairs as needed, and periodic treatment seem to be the best safeguards that can be given to roofs. Major roof repair or replacement is generally contracted out to reliable contractors.

General cleaning of window shades and blinds is a custodial function, but periodic checking as to the functioning ability of this equipment falls into the duties of the maintenance personnel. Many times the cloth on the roller-type blind can be reversed, thus lengthening the life of the equipment many years. Venetian blinds need adjustments and repair every four or five years, if they are to give maximum service. Auditorium curtains, drapes, and

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[1]Ralph G. Corwin, "Maintaining Interior Painted Surfaces," American School and University, 1957-58 (29th edition; New York: American School Publishing Company, 1957), p. 277.

other curtains need to be cleaned every five years if rotting is to be prevented.[1]

Moisture penetration, a common source of damage to buildings, comes chiefly through defective roofs, but windows, walls, and doors are also points of penetration. Regardless of the type of material used or how well the buildings have been constructed, the climate still tends to break down the exposed surfaces. Constant inspection is needed to discover where putty and caulking compounds have fallen away, where masonry joints have opened, and where other exterior surfaces have cracked.

School heating plants are usually given routine preventive maintenance at the close of each heating season. Under normal conditions, steam and hot water plants may need to be replaced about every thirty to thirty-five years.[2] Such plants, however, will need periodic maintenance at intervals of from five to ten years. Tubes will need to be replaced and cracks sealed.

Replacement maintenance. Replacement maintenance is concerned primarily with the repairs by substitution of new

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[1]Elbert L. Brickley, "Preventive Maintenance Planning," Custodial Training (January, 1957), 40.

[2]George Blumenaur, "Planned and Preventive Maintenance Can Save School Money," Nation's Schools, XLVIII (September, 1951), 90.

parts for old ones in furniture and equipment. The exact time for replacement is unpredictable, but carefully kept records, regular inspections, and experience may be of value in developing replacement schedules.

In another statement in Blumenaur's article, we find out:

> Roofing, plumbing, floor surfaces, furniture, and equipment are examples of areas where replacement maintenance may be required. For example, experience seems to indicate that roofing may have to be replaced every 20 - 25 years; plumbing, at intervals of 25 - 30 years; and floor surfaces, every 15 years.[1]

Furniture and equipment may be given many additional years of service if broken parts are repaired or replaced. In Lincoln, Nebraska, an "Eight-Year Plan" for furniture repair and replacement is said to be very satisfactory.

> Under this plan, all furniture in a particular building is repaired, refinished, and restored every eight years. This involves the replacement of damaged parts, such as wooden and metal legs, work surfaces and the like, and the insertion of new bolts, screws, and rivets where needed. If only refinishing is required for a piece of furniture, the work is accomplished at the individual school during either a holiday period or the summer vacation. When repairs require machine work, the furniture is carted to the central shop where machines are available.[2]

Other equipment such as typewriters, business

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[1] Ibid.

[2] R. H. Park, "Care of School Furniture," American School and University, 1955-56 (27th edition; New York: American School Publishing Company, 1955), p. 437.

machines, audio-visual equipment, clocks, and transportation equipment need to have parts replaced from time to time if the full life of the equipment is to be expected.

Emergency maintenance. Emergency maintenance may come at any inopportune time. If such maintenance must be done in order to keep the school plant in operation, it is referred to as emergency maintenance. It is impossible to allocate specific time for this type of maintenance, but many man-hours per year will be consumed doing emergency maintenance tasks.

Improvement maintenance. Improvement maintenance refers to repair and upkeep of the grounds and sites. It will include repair or replacement of walks, fences, drives, playgrounds, sewers, and ditches. Regrading, reseeding, and replacement of shrubs and bushes will also fall into this category.

IV. DETERMINING SHOP NEEDS

The size of the district, board policy, and the services to be rendered by the school plant personnel will decide the school district's maintenance shop and equipment requirements. A small school that has no definitely organized maintenance program and contracts most of its maintenance work done will have little need for a shop with

specialized equipment. On the other hand, a large system having a well defined maintenance department whose personnel perform all tasks needs several specialized shops and all types of tools and equipment if they are to provide prompt and economical service.

V. DETERMINING STAFF AND STAFF POLICIES

Selecting maintenance personnel, after the type of maintenance program has been determined, must be done in such a way to insure competent personnel to meet the requirements of the program.

Size. Depending on the type of program adopted, the maintenance staff may include laborers, semi-skilled workers, skilled workers, mechanics, etc., and the school system can determine these needs only by a trial and error method.

The New York State Education Department has suggested some criteria in determining the size of a staff needed:

1. Annual man-hours required by crafts.
2. Experience of similar systems with respect to staff size and costs.
3. Ratio of maintenance costs to plant and equipment value.
4. Ratio of maintenance costs to current operating costs.
5. Ratio of supervisors to workers.[1]

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[1] School Business Management Handbook: Operation and Maintenance, Bureau of Field and Financial Services (Albany, New York: New York State Education Department, 1955), p. 69.

Skills. In smaller school systems, it may not be feasible, or even financially possible, to employ a full complement of maintenance personnel with at least one skilled craftsman for each area of work. Most small districts, desiring to accomplish as much work as possible with a minimum maintenance force, seek men who have a multitude of skills. Tasks which require a high degree of specialization may be let out on contract under competitive bid procedures.

On the other hand, medium and large school systems may find it economical to employ one or more men who are skilled in each of the following areas: painting, masonry, carpentry, electricity, plumbing, heating, sheet metal, landscaping, and machine shop work.

Performance standards. If a maintenance program of a school district is to achieve high standards, there must be an organization whose responsible head will direct and coordinate all work to effect an easy flow of effective and efficient services in the best interest of the schools.[1] If any other type of leadership is present--that is, if

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[1]Henry H. Linn, "Developing a School Plant Maintenance Program," Planning for School Plant Insurance, Maintenance, and Operation, Educational Bulletin, Volume XXVI, No. 3 (Frankfort, Kentucky: State Department of Education, 1958), pp. 174-78.

there is sloppy work, buck passing, and shirking of responsibility--even though the cost of such a program with poorly trained personnel may be less, the over-all cost of maintenance will be higher in the long run. Things will have to be done over or equipment replaced before it should really be necessary.

Lines of authority for supervisory control of all school employees should be so well established and so clearly defined that the employees understand their relationship. Of fundamental importance is the concept that all employees are members of a team working together to provide the very best opportunities obtainable for child development. The duties of each group of employees are difficult, yet all members should seek to create an environment in which the learning process may be carried on in the most efficient manner.

Work load. The size of the school, the age of the buildings, and the condition of the building, grounds, and equipment will all have a bearing on the amount of work that will be expected from the maintenance personnel. Also, the relationship of custodial duties and maintenance duties within the system will determine who does what job.

Personal characteristics. An effective, well managed, economically operated school maintenance program can be more

readily developed if the school officials will remember that it is better to keep inefficient, unqualified workers out of the system by the process of "selection" than to eliminate them later through the process of "separation."[1]

In selecting personnel, officials should consider such personal characteristics as: age, health and physical fitness, character, habits, responsibility, training, and experience.

Just because a "nice old fellow" in town needs a job, the school should not feel obligated to put him on the maintenance staff. In an article in the American School Board Journal, Reeves stated:

> It is generally recognized that the most satisfactory age for original employment of school plant personnel is between 25 and 40 years. If an employee is too young, he may not command the respect of administrative and maintenance personnel; if too old, he may be slow, inefficient, and physically unable to do the job. The development of an efficient maintenance department may well be conditioned by the selection of personnel who are young enough to do a full day's work and old enough to exercise good judgment.[2]

Unimpeachable character, approved habits, and a sense of responsibility are personal characteristics which should not be overlooked by officials when they select school plant

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[1]Finchum, School Plant Management, p. 24.

[2]Charles Everland Reeves, "The Employment and Organization of School Plant Personnel," American School Board Journal, CXXI (December, 1950), 37.

maintenance personnel. Individuals whose conduct, reputation, and habits are questionable often fail to accept responsibility, are not receptive to suggestions for improvement, frequently shirk their responsibilities, and sometimes demoralize their associates. Although these traits are not always discernible, officials may be able to spot undesirable candidates by reviewing their employment records, by investigating their interest in civic, church, and fraternal affairs, by analyzing their philosophy of life, and by observing their home conditions.[1]

Training and experience are necessary if high standards and efficient methods of work are to be achieved in a maintenance program. The personnel must fit the job into which they are placed. If a man does not have previous training, the district should select only those men who are willing to serve a probationary period before going on regular employment.

Personnel policies. The successful operation of schools, increasingly dependent upon the efficient services of school plant employees, may be more readily accomplished if conditions contribute to a high level of morale among

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[1]George H. Bush, "Qualifications, Preparatory, and In-Service Training of Plant Operation Employees," 1950 Proceedings (Kalamazoo, Michigan: Association of School Business Officials, 1950), pp. 160-66.

these employees. Boards of education can do much to insure these conditions by developing, adopting, and enforcing definite personnel policies.

Some sort of an application form should be used, to be completed by each applicant with the desired information. A file of all these applications should be set up after a thorough investigation of previous work records, habits, character, and attitudes has been made. This investigation should be conducted by correspondence or by telephone, but since forthright statements about an applicant are more freely given in conversation than in writing, some authorities recommend the exclusive use of the telephone.[1]

After these investigations have been completed, all applicants should be interviewed, given a competitive written examination, and required to take a performance test. The interview may reveal certain traits, characteristics, and attitudes not previously shown: the written examination will determine ability to read, write, and follow instructions; the performance test will show proficiency, or lack of it, in the specific skills required in the position.

Regardless of the process of selecting personnel, it

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[1]Lowell D. Jackson, "Selecting School Custodians and Maintenance Men," American School Board Journal, CXXX (June, 1955), 34.

seems necessary that all new employees should be required to serve a probationary period of not less than six months nor more than one year before being placed on permanent status. During this period, they will have an opportunity to demonstrate their competency, secure approval of fellow workers, and establish rapport with the organization. New employees who fail to make satisfactory progress in jobs to which they have been assigned can be transferred to other jobs to which they are more suited, or be discharged, at the discretion of the board or employment officer.

On the other hand, personnel who have successfully completed the probationary period should be placed on permanent status and considered for promotion when job vacancies occur. Prime factors in determining promotion policies should be competency, merit, attitude, and aptitude.

Whether maintenance personnel are placed on a definite salary schedule, or if a method of collective bargaining is used to determine yearly salary, the important thing to remember is that the amount of the beginning salary will largely determine whether the school system is to secure maintenance personnel with satisfactory qualifications. Finchum has stated that high wages and salaries generally attract people with high qualifications; low wages and

salaries, those with low qualifications.[1]

In industry and other types of employment, a forty-hour work week is now standard practice. Fairness to school plant employees seems to make it imperative that they be assigned a similar work week.

In order to avoid any question on the part of either labor or management with regard to holidays, Finchum suggested that boards of education should have a written policy which stipulates the specific holidays for which employees are to be paid.[2] For example, which of the following are to be paid holidays? Good Friday, Memorial Day, Labor Day, Fourth of July, Christmas, New Year's. If any of these days fall on weekends, what sort of arrangement should be provided for Friday or Monday to represent the holiday as far as the worker is concerned?

Nonprofessional school employees, like other school employees, have various illnesses. When ill, an employee should not be expected to work, and, when the illness is of reasonable duration, he should not be required to forfeit wages while recuperating. Boards of education should adopt a definite written sick-leave policy which will protect the school district from abuse and the employee from wage loss.

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[1]Finchum, School Plant Management, p. 32.

[2]Ibid., p. 33.

The employee who is ill but continues to work exposes other employees to possible disease and prolongs the period of his own illness. He seriously impairs his own efficiency and may cause accidents to himself and others, thus creating possible district liability for the accidents. In school districts where full-time, nonprofessional employees are allowed vacations with pay, an allowance of two weeks seems to be the general policy.[1]

Workmen's compensation insurance, by state law, must be provided by each local school district. Article 85.2 of the School Laws of Iowa states:

> When the state, county, municipal corporation, school district, or city under any form of government is the employer, the provisions of this chapter for the payment of compensation and amount thereof for an injury sustained by an employee of such employer shall be exclusive, compulsory and obligatory upon both employer and employee, except as otherwise provided in section 85.1.[2]

Other types of insurance, such as group health insurance, can be provided for all employees, providing seventy-five per cent of the employed personnel desire such insurance.

If school boards adopt retirement plans and contribute funds to help provide retirement income for school

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[1] Ibid.

[2] State Department of Public Instruction, School Laws of Iowa, 1958, Article 85.2 (Des Moines: The State of Iowa, 1960), p. 260.

personnel, written policies should be carefully formulated to cover such things as: contributions, retirement age, monthly benefits, death benefits, and rights of survivors.

There are arguments for and against specific ages for compulsory retirement, but if school boards adopt policies establishing retirement ages, they have an obligation to assure those concerned some means of livelihood after retirement.

The School Laws of Iowa again specify that all schools must require employees to belong to the Iowa Public Employees Retirement System as stated in Article 97B.42:

> Each employee whose employment commences after July 4, 1953 . . . shall become a member upon the first day of the month following the month in which such employee is employed. He shall continue to be a member so long as he continues in public employment. . . .[1]

Payment of funds to such a retirement fund are made by both the employer and the employee, again as specified by state law. The age of retirement is left up to the local employing agency, but provisions are made by state law for retirement and benefits at ages fifty-five,[2] sixty-five,[3] and seventy.[4]

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[1] Ibid., Article 97B.42, p. 318.

[2] Ibid., Article 97B.47, p. 320.

[3] Ibid., Article 97B.45, p. 319.

[4] Ibid., Article 97B.46, p. 319.

In addition to the above discussed personnel policies, boards of education may want to have written policies covering such things as: bereavement leave, court attendance, dental and medical visits, illness in the family, and coffee breaks.

VI. FINANCING A MAINTENANCE PROGRAM

In order to have an effective school maintenance program, there must be adequate financing. In Iowa, this financing is made possible through local taxes. Far too often, the maintenance budget is the first to be cut when school expenditures have to be reduced. School officials can, and must, defend proposed expenditures by presenting tangible evidence of the importance of maintenance to the school district.

Maintenance budget. An important fact to be remembered in making out maintenance budgets is to keep the budget as uniform as possible in order to prevent excessive costs one year and meager costs another year.[1] This will also help to develop a systematic plan of work for maintenance personnel as discussed earlier, create a favorable impression on taxpayers, and may play an important part in

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[1]Finchum, School Plant Management, p. 61.

determining whether or not the budget will be accepted by the board.

A review of the maintenance survey is of utmost importance before attempting to work on the budget. The exact condition of each site, each building, and all the equipment must be decided, with an estimate of the cost of each maintenance task that is to be performed. If the survey team has done their job properly, priorities will have been established for each task and at this time only a review of the survey will be necessary for determining which tasks should be included.

Three definite recommendations can be presented in the proposed budget--one showing the recommendations having priority "1" for all the schools in the district with a total estimated cost, another showing priority "2" items with their estimated cost, and a final showing the priority "3" items with their estimated cost.[1]

Most districts will find it impossible to provide funds to meet all three priorities during one year, but, by making the recommendations, the board of education will become aware of the future needs that will need to be included in a budget. Parents and interested lay people will also be satisfied because they will be able to see that

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[1] Ibid., p. 65.

all schools are being treated fairly and equally, thus making for good community-board relationships.

Maintenance records. The main purpose for keeping maintenance records is to supply useful information concerning school maintenance services.[1] These records provide a history of property and equipment, establish accurate data for cost estimates, and provide details of each project performed.

Inventory records should provide an accurate list of all school property, equipment, furniture, and supplies with respect to type, quantity, location, condition, and value. Several inventory forms may be necessary for listing such items.

Cost records will show just how much the school district is paying for their repair work. Included in this record should be a description of the job, a list of the materials used, the types and amounts of labor employed, and the dates on which the project was started and completed.

Contractual records should include information concerning all maintenance work done by persons other than the school maintenance personnel. Such jobs are usually given to local contractors on the basis of competitive bids

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[1] Ibid., p. 66.

because they are beyond the abilities of the school personnel. Included in these records should be working plans and specifications, as well as any performance, surety, or warranty bonds issued, or insurance issued covering district liability.

CHAPTER III

EXAMINATION OF URBANDALE MAINTENANCE PROGRAM

The writer of this paper, having been employed as Assistant Superintendent of the Urbandale Schools for the last year, has been closely associated with the maintenance program, this being one of the areas of supervision assigned to him. Having worked in this capacity for one year, he conducted a continuous examination of the buildings and the findings of this report are a result of his observations.

The Urbandale Community School District, a rectangle about four miles long and one and a half miles wide, extends from Merle Hay Road and 63rd Street on the east to Inter-State Highway 35 on the west, and from Meredith Drive on the north to Urbandale Avenue on the south.[1] Although the district is the smallest geographically in Polk County (six square miles), it ranks fifth out of nine in enrollment in the county and fifty-fifth among the schools of the state.[2] Table I shows how the Urbandale Community School District's building program has attempted to keep pace with the rapid growth taking place in the community.

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[1]Polk County Auditor's Office, "Official Map of Polk County" (Des Moines: American Lithographing and Printing, 1959).

[2]Lyle W. Kehm, "Superintendent's Annual Report to the

TABLE I

CHRONOLOGICAL LIST OF URBANDALE FACILITIES, 1917-1964

Year*	Name of building
1917	Junior High School Annex
1925	Junior High School main building started
1933	Junior High School main building enlarged
1940	Junior High School Gymnasium erected
1952	Millard Olmsted Elementary School started
1953	Millard Olmsted Elementary School enlarged
1954	Millard Olmsted Elementary School enlarged
1958	Senior High School started
1961	Blackhurst Elementary School first unit erected
1961	Karen Acres Elementary School purchased (3 rooms)
1962	Two-classroom building erected on Junior High site
1963	Senior High School enlarged
1963	Valerius Elementary School first unit erected
1963	Jensen Elementary School first unit erected
1964	Karen Acres Elementary School erected
1964	Two-classroom building erected on Junior High site

*Year constructed

I. SITES

The Urbandale school district has at the present time eight school sites, of which seven have one or more buildings occupying them.

Junior High School. The Junior High School site is located at the corner of 70th Street and Douglas Avenue in the center of the business district of Urbandale. A two-

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School Board" (Urbandale, Iowa: Urbandale Community Schools, 1963. (Mimeographed.)

room frame building, now located at the southwest corner of the site, served the entire school population, kindergarten through eighth grade, from 1917, when the town was incorporated, to 1925. This building, now known as the Annex, has been remodeled and changed over many times in the last forty-six years and still serves the Junior High School with two classrooms upstairs, one of which is used for a lunch room, and a homemaking room in the basement. This building is old but structurally sound and has been rewired in recent years. In 1960, a new hot air furnace was installed and in 1963 a new sink was installed and a new refrigerator purchased to help serve the lunch needs better. This same lunch room is also used as an art room, so the installation of the sink was of value in this area also. Also in 1963, the homemaking room was remodeled and redecorated, and further remodeling is going on during the summer of 1964.

In 1925, the present main building of the Junior High School campus was started; it was enlarged in 1933. In 1940, a gymnasium was added, and this now comprises the main facility at this site--nine classrooms, a large study hall, a library, an office, and a gym. Major renovation is taking place in this structure in 1964 so that it might better serve the needs of the students. Locker space has always been badly needed so a small work room on the second floor has been overhauled to provide space for sixty-eight addi-

tional two-passenger lockers. Ceilings in all halls have been replaced and lowered. Stair treads have been removed and replaced on all stairways, as well as new tile on all stair landings. The main entrance is being enlarged to provide a safer flow of traffic in and out of the building. Both restrooms are being remodeled to increase their capacity. Room 10, which was originally an open space between the main building and the gym but was later closed in to make a shop, is being remodeled and a new floor being installed to provide an additional permanent classroom. A new heating unit is being installed in this room also to provide proper heat and ventilation.

Also in 1964, replacement windows were installed on the ground level of this building to insure better heating, better lighting, and better security as well as aesthetic enrichment to the entire structure.

A new chain link fence was installed on the north property line in 1963, with the old one being moved to the south property line. This old fence was painted during the summer of 1964 to bring its appearance to that of a new fence and thus improve the over-all appearance of the site.

The old stoker-type boilers were converted to gas in 1962, and other minor heating renovation was done at that time. New wiring has been done in this building and a new roof was installed several years ago.

In 1963, a three-year student desk replacement program was completed and in 1964 new teacher desks were purchased for the entire building. Also in 1963, all the wooden floors were sanded and refinished.

In 1962, the gym ceiling was spray painted and in 1964 the floor was sanded and refinished. Also in 1964, the locker rooms were completely redone and monies set aside to construct additional locker room space to accommodate the large increase in school population.

Fluorescent lights have replaced the incandescent lights throughout the entire building.

In 1962, a two-classroom steel building was erected on the Junior High School site. Also included in this building are two restrooms and a furnace room.

In 1964, another similar building is under construction, and locker space will be provided in these two buildings for one hundred twenty-eight students, or the capacity of the building (four rooms with a maximum of thirty-two students in a homeroom situation).

In 1964, virtually all the classrooms in the main building were painted and much interior wall repair was done.

In 1963, a big improvement was made to the site by installing a blacktop parking area. This area is also used as a playcourt on days that weather will permit.

Millard Olmsted Elementary School. In 19
Urbandale Community School District felt the nee
classroom space for its elementary children and
bond issue to build an eleven-classroom buildin
office space and two restrooms, on a site it al
Also on this site was a house that had been ori
farmhouse of Millard Olmsted. In 1953, four mo
and two restrooms were added in the form of a w
south and in 1954 four more classrooms, a multi-
room, and a kitchen were added to the west.

In 1960, the entire outside of the build
painted and in 1964 all the inside rooms were p
well as the two main outside entrances. Also i
the project counters in the west wing were refi

Roof repair at this building is a yearly
project. In 1963, major replacement and repair
roller-type and Venetian blinds was accomplishe

Senior High School. In 1958, the need f
high school building was felt, and the district
passed a bond issue by ninety-five to five to u
district's bonding ability to purchase twenty-f
land and build the first wing of nine classroom
and restrooms of a proposed high school campus.
the second phase of the high school plant was c

grades ten, eleven, and twelve moved in for the 1963-64 term. Previously the first wing of the plant was used by grades seven and eight.

This facility now consists of twelve regular classrooms, two science laboratories, music room, study hall, library, shop, multi-purpose room with serving kitchen and shower room, and an office.

In 1962, the proposed football field was seeded and in 1964 lights and a chain link fence were installed, with the hope that the field will be ready for use in the 1964-65 school year.

In 1963, an asphalt playcourt was built outside the multi-purpose room to provide additional Physical Education play area. In 1964, a baseball diamond was roughed out with further monies set aside to develop it more in the summer of 1965. Also in 1964, four basketball goals were installed on the playcourt to make it even more useful as a tool for gym classes. The parking area was also expanded in the summer of 1964 and improved a great deal.

Minor painting was done in the old wing during the summer of 1964.

Blackhurst Elementary School. In 1961, the voters of the Urbandale school district again passed a bond issue for the construction of Blackhurst Elementary School to be

constructed on a site already owned at 3305 - 70th Street. This building consists of seven classrooms, an office, library, multi-purpose room with a serving kitchen, and individual classroom restrooms. It is the philosophy of the school district to operate neighborhood schools, and for this reason several one-unit structures are present in Urbandale.

During the summer of 1964, minor painting was done in the Blackhurst school.

Valerius Elementary School. In 1963, the voters passed a resolution whereby enough money was transferred from the general fund to the schoolhouse fund to build another seven-classroom building--Valerius Elementary School--on a site owned at 3305 - 92nd Street. This building also has an office, library, multi-purpose room with a serving kitchen, and individual restrooms in each classroom. Additional landscaping and sodding were done at this site during June 1964.

Jensen Elementary School. Also in 1963, another bond issue was passed to provide money to build a twin building to the Valerius school at 64th Street and Aurora Avenue. This is known as Jensen Elementary School. During the summer of 1964, additional seeding and landscaping was done at this site.

Karen Acres Elementary School. In 1961, the Urbandale school district purchased from a developer a three-room building which they had been renting for several years as classrooms--the Karen Acres Elementary School. In 1964, a bond issue was passed to add a ten-classroom building with office and storage space, library, multi-purpose room with serving kitchen, and individual restrooms to the site. This building is expected to be ready for use for the term 1964-65.

Grant site. The Grant site was purchased in 1962 for a possible elementary building when the time arose. It is located about one-half mile north of Douglas Avenue and about one-fourth mile west of Clive Road in a now undeveloped area.

II. STAFF

The custodial-maintenance staff of the Urbandale school district consists of seven men supplemented by high school boys who help with cleaning operations after school and also help with work during the summer months. Each of the men has specific assignments insofar as buildings during the school year and is responsible to see that they are in operating condition each day of the school term. During the summer months, the men are assigned to work crews to do

various maintenance work. Only emergency maintenance is done during the school term. Repair work that cannot be handled by the staff during the school year, or during the summer months, is contracted out, either on a bid basis if the size of the task is large enough or by direct contract.

Also during the summer months, the staff is complemented by several of the school teaching staff who are interested.

III. EQUIPMENT

The school district owns three school buses, one dump truck, one panel truck, one van truck, and one tractor insofar as motor vehicles. In addition, the district has in its possession four hand mowers, three wet-dry vacuum pick up machines, four scrub-buff machines, and various other small tools. Other equipment is available during the summer months from the junior high and high school shops.

IV. ORGANIZATION

As has already been established, the Urbandale School Maintenance Program is organized as a maintenance staff intermingled with summer and other assistance from regular custodians, together with local journeymen being brought in at various times and contracted work engaged in as needed. The Assistant Superintendent is acting head of the mainte-

nance program, and all work is cleared through his office. He is the direct representative to the school board and presents all problems and recommendations to them for their approval.

V. FINANCING

A maintenance survey is made each fall with the school board and school administrators to determine the present condition of all sites and facilities. Recommendations are made at that time as to the potential needs, and this is recorded for future budget planning.

When the budget is being prepared, the already recommended tasks are included, plus any others that the director of maintenance feels are worthy of being done. The budget is presented to the board and discussion follows in regards to exactly which projects will be included.

CHAPTER IV

ANALYSIS OF URBANDALE MAINTENANCE PROGRAM IN CONSIDERATION OF ESTABLISHED CRITERIA

The writer of this paper, having been associated with the Urbandale school system for over seven years but with only one year of direct association with the maintenance program, will present an analysis of the maintenance program with recommendations resulting from consideration of the criteria thus far established in this report.

I. TYPE OF PROGRAM

The maintenance work of the Urbandale Community School District is done generally by the custodial staff, who become the maintenance staff during the summer months. This staff is supplemented by high school students throughout the school year and is further supplemented by teachers during the summer months. Maintenance projects that fall beyond the abilities of this group are awarded to contractors on the basis of competitive bids. Until the last few years, this type of organization has proven quite adequate for the district, but with the increasing number of buildings that are to be kept in the peak of condition a more highly trained and qualified maintenance staff seems to be required.

The director of maintenance should be a person trained in the areas of maintenance and supplies and should also have some abilities to handle administrative duties. One or more full-time maintenance men are needed in addition to the present custodial staff to take care of any emergency maintenance that comes up from time to time and to do the many tasks which fall into recurring maintenance such as furniture repair, heating and plumbing repairs, glass replacement, etc. This maintenance man could be kept busy by having him serve the seven building areas and could be assisted by the custodian of the building during some of his less occupied time.

By having a highly qualified full-time maintenance staff, some of the jobs that are left to be done during the summer months could be done immediately and, as a result, less loss of time on the part of students and teachers as well as lower repair costs would be experienced since the job would be done before major damage would occur.

The fact that the Urbandale school district ranks fifty-fifth in the state of Iowa in size indicates that it is no longer a "country school," but rather a "big business," which must be operated as such.

II. ESTABLISHING NEEDS

Each year shortly after school opens in the fall, the

school board and school administrators take a tour of the buildings to admire any work that has been done during the summer months and point out any projects that have not been accomplished and will need to be done at a future date. Throughout the year, the Assistant Superintendent makes periodic checks and notes areas that will be needing attention, both in the immediate future and the long-range future. Sometime in April or May, the tasks that have been noted are listed and a tentative time table for summer maintenance work is developed. Supplies that are on hand are inventoried and needs for the future year determined and placed out for competitive bidding.

A definite check list needs to be developed in the Urbandale school district for use by a survey team each year in going through the buildings. This survey team should not be composed of the administrators and school board members, but rather of the director of maintenance, the building principal and custodian, the board members in charge of buildings and grounds, selected teachers, and interested lay members of the community. This team should function sometime during the winter months in order to observe the heating plant in actual operation.

After a complete survey of the site, building, and equipment has been made by the team, a discussion should be held to determine priorities in regards to the projects to

be accomplished. This discussion should be held right in the building immediately after the tour, so that if there is any area that has to be re-inspected the team will be able to do it without another trip to the building.

Periodic inspections should be made at least once a month by the building principal and his custodian, but two inspections a month would better serve the needs. A report should be filed with the Assistant Superintendent following the inspection, listing items that need immediate attention and those that should be considered for summer scheduling.

During the summer months, experts should be brought in for other inspection as need demands. It should not be expected that the Assistant Superintendent or director of maintenance be structural or mechanical engineers, but rather persons with general knowledge and enough common sense to draw in experts as needs arise.

III. MAINTENANCE SCHEDULES

At the present time, every maintenance job in the Urbandale Community School District falls either into emergency maintenance or summer maintenance, with the result that there is some waste and destruction present which could be stopped if definite maintenance schedules (recurring, periodic, replacement, emergency, improvement) were developed. However, this type of scheduling would be impossible

unless some sort of a full-time maintenance staff would be established.

Taking into consideration its lack of actual maintenance staff, the Urbandale Community School District Maintenance Program is operating far more efficiently than might be imagined due to the fact that the custodial staff has the ability and the personality to meet the ever arising needs of maintenance. The staff works well together and has many abilities distributed among its seven members.

However, if a definite maintenance man was employed, it is certain that operational duties could, and would, be better accomplished, since more time by each custodian could be spent in his own building doing his assigned custodial duties. When operation and maintenance overlap, usually both suffer, and it is hard to say which one suffers the most.

IV. SHOP NEEDS

When the Urbandale Community School District establishes a full-time maintenance staff, an area in which to do major and minor repair work year round will be needed. No longer will summer use of the junior high and senior high shops be sufficient. In connection with this shop, an area in which to store supplies--custodial, maintenance, and academic--is needed rather than to have these supplies

scattered throughout the entire district. This in itself--stock control--could cut down expenditures.

Minor furniture repair, which at the present time is being overlooked, could be accomplished with the result that less chairs and desks would be required because broken ones would not be sitting idle.

V. STAFF AND POLICIES

As has been pointed out earlier in this chapter, a director of maintenance and at least one maintenance man are needed immediately. How soon a shop is erected will determine how fast the maintenance staff will increase. With the present number of buildings and the use they get during evening hours, it would not be out of line to employ a night man whose duties would include building security and floor care. This man could have part-time assistance as the need arose to accomplish the floor care. The result of the employment of such a person would insure better security of the buildings, better care of the floors, and reduced cost of floor care, since he would become an expert in floor care and would use the products more efficiently.

By employing a director of maintenance, the school district would have a responsible leader who would be in direct control and contact with the maintenance program, rather than someone who only tries to coordinate the program.

Better use of time could be achieved by the custodians, as well as any maintenance men who would be employed, due to more direct supervision. Performance standards would be raised, again due to direct supervision and control.

A definite handbook is needed to spell out all policies both for custodial and maintenance men. This handbook should include the method of application and employment, salary, hours of work, non-working holidays for which employees will be paid and method of compensation in case necessity demands working on these days, amount of sick leave and just what is considered sick leave, type of insurance provided, and age of required retirement.

Many of these areas are covered in the teachers' handbook, and, since they apply to all public employees, they apply to the custodial and maintenance staff as well as all other nonprofessional employees.

VI. FINANCING

Facts and figures are available for all maintenance work done in the district for many years, but they are scattered in several places. Facts and figures for work done the last five years are pretty well gathered together in one file in the Superintendent's office. However, a better organized method of this knowledge would be of great value. Forms should be drawn up which will have immediate

meaning to the administration when they are making budget preparations each year.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

As a result of an investigation of the criteria needed for an effective maintenance program and an analysis of the facilities and maintenance program of the Urbandale Community School District, the following conclusions and recommendations are made in regard to the maintenance program:

1. The type of program in the district needs to be expanded to include a definite maintenance staff to handle year round maintenance tasks. Immediate steps should be taken to employ a man to fill a position of "maintenance man," whose job it would be to serve all the buildings in the district and handle as many recurring and periodic maintenance tasks as possible, so that fewer major jobs build up for summer maintenance. The custodial staff should still help in the maintenance area by giving assistance to the maintenance man and also by taking the role of maintenance staff during the summer months. As soon as possible, a director of maintenance should be added to the staff to coordinate and oversee the entire maintenance program in the district. This person would be responsible for

making out a maintenance check list that would fit the Urbandale situation and conducting a complete survey of all buildings with a survey team.

2. Long-range planning needs to be developed, and, with the results of the maintenance survey, the director of maintenance would be able to develop such a plan. Through routine inspections, additional information would be available to the director to supplement the information gathered from the original check list.

3. A tentative time table should be developed for all recurring, periodic, and replacement maintenance work. Strict adherence to this time table would not be expected, but some goal must be set and then direction taken by the staff to reach this goal. The painting schedule and others like this would have to be revised every year, but by setting up a definite maintenance schedule more efficiency in the program will be achieved.

4. With the employment of a full-time maintenance man a reality, the need for a shop-warehouse will be very pressing, so that there would be a place where improvement maintenance jobs can be accomplished. In addition to this, the shop-warehouse building could serve the district as a stock control center

of not only the maintenance and custodial supplies, but also of the curriculum supplies. Although not mentioned in this report, there is a lack of available space for any such curriculum storage at the present time.

5. A handbook for all noncertified personnel is a need that should be supplied at the earliest possible time, so that all these staff members will have information, in writing, concerning vital questions. Included in this handbook should be information concerning hours of work, salary, method of employment, paid holidays, sick leave policies, insurance possibilities, retirement requirements, and other applicable policies.

6. The maintenance staff might also be supplemented by the hiring of a night maintenance man who would also serve as a security measure to the district by checking all buildings to make sure they are locked and secure for the night. With so many night activities taking place in the Urbandale schools, this man could also be in charge of the building when it is open for any reason at all. While he would be on duty in this capacity, he could also do minor recurring and periodic maintenance tasks. This would relieve any of the custodians from

coming back in the evening for additional duties, as they now do.

Although these conclusions are incomplete and the recommendations are far from realities, the acceptance and employment of all six of the above listed items would improve the maintenance program of the Urbandale Community School District greatly. More expenditure of funds would be necessary, especially in the area of salaries, but the added life the buildings would gain would more than offset the expenditures on salaries. Good maintenance costs money, but it is money well spent in that it prolongs the life of all buildings as well as equipment.

BIBLIOGRAPHY

BIBLIOGRAPHY

A. BOOKS

Cooper, Dan. Administrative Planning for School Programs and Plants. Chicago: University of Chicago Press, 1947.

Englehardt, N. L. Public School Business Administration. New York: Columbia University, Teachers College, 1927.

Morphet, Edgar. Educational Administration: Concepts, Practices, and Issues. Englewood Cliffs, New Jersey: Prentice-Hall, 1959.

Pierce, David A. Saving Dollars in Building Schools. New York: Reinhold Publishing Corporation, 1959.

Womrath, George. Effective Business Administration in Public Schools. New York: Bruce Publishing Company, 1932.

B. PUBLICATIONS OF THE GOVERNMENT, LEARNED SOCIETIES, AND OTHER ORGANIZATIONS

Bush, George H. "Maintenance Practices for New School Buildings," American School and University, 1957-58. 29th edition. New York: American School Publishing Company, 1957. Pp. 274-75.

_____. "Qualifications, Preparatory, and In-Service Training of Plant Operation Employees," 1950 Proceedings. Kalamazoo, Michigan: Association of School Business Officials, 1950. Pp. 160-69.

Corwin, Ralph G. "Maintaining Interior Painted Surfaces," American School and University, 1957-58. 29th edition. New York: American School Publishing Company, 1957. P. 277.

Finchum, R. N. School Building Maintenance Procedures. United States Department of Health, Education, and Welfare, No. 17. Washington: Government Printing Office, 1964.

_____. School Plant Management. United States Department of Health, Education, and Welfare, No. 15. Washington: Government Printing Office, 1960.

Linn, Henry H. "Developing a School Plant Maintenance Program," Planning for School Plant Insurance, Maintenance, and Operation. Educational Bulletin, Volume XXVI, No. 3. Frankfort, Kentucky: State Department of Education, 1958. Pp. 174-78.

_____. "Economies in Plant Operation," American School and University, 1945-46. 17th edition. New York: American School Publishing Company, 1945. Pp. 281-89.

Miller, Graham R. "Program for Preventive Maintenance," American School and University, 1954-55. 26th edition. New York: American School Publishing Company, 1954. Pp. 458-59.

Park, R. H. "Care of School Furniture," American School and University, 1955-56. 27th edition. New York: American School Publishing Company, 1955. P. 437.

Patterson, Nathan M. "Long-Range Maintenance and Yearly Maintenance," 1957 Proceedings. Evanston, Illinois: Association of School Business Officials, 1958. Pp. 103-7.

School Business Management Handbook: Operation and Maintenance. Publication of the Bureau of Field and Financial Services. Albany, New York: New York State Education Department, 1955.

State Department of Public Instruction. School Laws of Iowa, 1958. Des Moines: The State of Iowa, 1960.

Tucker, Buven E. "Operations of a Floor Maintenance Crew," American School and University, 1956-57. 28th edition. New York: American School Publishing Company, 1956. P. 432.

Walton, Harry F. "Surveying and Programming Maintenance Needs," 1952 Proceedings. Kalamazoo, Michigan: Association of School Business Officials, 1952. Pp. 102-9.

C. PERIODICALS

Blumenaur, George. "Planned and Preventive Maintenance Can Save School Money," Nation's Schools, XLVIII (September, 1951), 88-90.

Brickley, Elbert L. "Preventive Maintenance Planning," Custodial Training (January, 1957), 40-42.

Cornell, C. M. "Preventative Maintenance of Buildings," The Nation's Schools, LVI (October, 1955), 104-8.

Fernalld, Otto K. "How Many Custodians Do You Need?," School Management, II (October, 1958), 62-68.

"How to Reduce Maintenance Costs," School Management, II (February, 1958), 32.

Irmiter, Richard. "The Care and Cleaning of Plumbing Fixtures in School Buildings," American School Board Journal, CXIX (July, 1949), 45-47.

Jackson, Lowell D. "Selecting School Custodians and Maintenance Men," American School Board Journal, CXXX (June, 1955), 34.

Kearney, Paul. "How Fire-Safe Is Your Child's School?," National Parent Teacher, LIV (September, 1959), 10-12.

King, Richard A. "Developing Progressive Maintenance," American School Board Journal, CXXXVI (May, 1958), 55-65.

Reeves, Charles Everland. "The Employment and Organization of School Plant Personnel," American School Board Journal, CXXI (December, 1950), 37.

Viles, N. E. "Maintaining and Replacing Schools," American School Board Journal, CXXXIX (July, 1959), 23-25.

D. UNPUBLISHED MATERIALS

Kehm, Lyle W. "Superintendent's Annual Report to the School Board." Urbandale, Iowa: Urbandale Community Schools, 1963. (Mimeographed.)

Polk County Auditor's Office. "Official Map of Polk County." Des Moines: American Lithographing and Printing, 1959.

APPENDIX

SCHOOL _____ INSPECTION DATE _____

Age of building _____
Location of building _____
Survey team _____
_____

ITEM	Condition	Needs	Estimated cost	Priority	Remarks
SITE					
Landscaping					
turf					
shrubs					
flowers					
erosion					
drainage					
Traffic areas					
sidewalks					
steps					
entryways					
railings					
roads					
parking lots					
loading docks					
safety					
Play areas					
surfaces					
play equipment					
Phy. Ed. equipment					
safety					
BUILDINGS					
Exterior					
roof					
flashings					
fascia					
skylights					
chimneys					
vent pipes					
ventilators					
gutters					
downspouts					
deck					
walls					
above ground					
cornices					
windows					
doors					
thresholds					
vents & louvers					

ITEM	Condition	Needs	Estimated cost	Priority	Remarks
below grade					
footings					
foundations					
joints between sidewalks & bldg.					
window wells					
expansion joints					
storm sewers					
catch basins					
Interior					
structure					
ceilings					
walls					
floors					
stairs					
stairwells					
finishes					
plaster					
paint					
tile					
light					
wiring					
fixtures					
windows					
shades					
exit lights					
plumbing					
fountains					
lavatories					
water closets					
urinals					
showers					
sinks					
heating					
furnaces					
motors					
ducts					
controls					
doors & hardware					
built-ins					
bulletin boards					
chalk boards					
lockers					
display cases					
EQUIPMENT					
Vehicles					
trucks-buses					

ITEM	Condition	Needs	Estimated cost	Priority	Remarks
mowers					
tractors					
Maintenance					
scrub machines					
pick up machines					
power tools					
hand tools					
Furniture					
student desks					
chairs					
teachers' desks					
tables					
book cases					
lounge chairs					
stage props					
Lunch room & activity room					
tables					
chairs					
refrigerators					
stoves					
disposals					
dishes & utensils					
dish washer					
Science rooms					
lab tables					
display cases					
storage cabinets					
experimenting devices					
models					
specimens					
Audio-visual					
projectors					
screens					
films & filmstrips					
radios					
record players					
globes & maps					
Homemaking					
stoves					
refrigerators					
freezers					
washer					
dryer					
sewing machines					
Business Education					
typewriters					
dictaphones					

ITEM	Condition	Needs	Estimated cost	Priority	Remarks
calculators					
adding machines					
reproducing machines					
others					
School office					
intercom					
reproducing machines					
adding machines					
radio					
safes					
others					
Industrial Arts Shop					
power tools					
hand tools					
Physical Education					
mats					
ropes					
tumbling apparatus					
lockers					
bleachers					
balls, etc.					
Auditorium					
curtains					
lights					
seats & chairs					
General					
fire extinguishers					